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Pygmy resonance in neutron-rich Ne isotopes

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Microscopic structure of the low-lying isovector dipole excitation mode
in neutron-rich ^{26,28,30}Ne is investigated by performing
deformed quasiparticle-random-phase-approximation (QRPA) calculations.
The particle-hole residual interaction is derived from a Skyrme force
through a Landau-Migdal approximation.
We have obtained the low-lying resonance in ^{26}Ne at around 8.5 MeV.
It is found that the isovector dipole strength at $E_x < 10$ MeV exhausts
about 6.0\% of the classical Thomas-Reiche-Kuhn dipole sum rule.
This excitation mode is composed of several QRPA eigenmodes,
one is generated by a $\nu(2s^{-1}_{1/2}2p_{3/2})$ transition dominantly,
and the other mostly by a $\nu(2s^{-1}_{1/2}2p_{1/2})$ transition.
The neutron excitations take place outside of the nuclear surface
reflecting the spatially extended structure of the $2s_{1/2}$ wave function.
In ^{30}Ne, the deformation splitting of the giant resonance is large, and
the low-lying resonance is overlapping with the giant resonance.

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